

Extraction of bioactive compounds from *Nannochloropsis gaditana* via sub-critical water extraction (SWE)

ABSTRACT

Microalgae are being consumed as supplements because they are rich in protein, vitamins, carbohydrates and lipids. Hence, extraction processes to obtain the bioactive compounds are being extensively studied and developed. Sub-critical water extraction (SWE) technology has been used in extracting active compounds from different biomass materials with low process cost, mild operating conditions, short process times, and environmental sustainability. Therefore, this study utilizes SWE for extracting biochemical compounds such as lipids, carbohydrates and protein from *Nannochloropsis gaditana*. Different parameters were applied include temperature (156°C-274°C), biomass loading (33 g/L-117 g/L) and retention time (6.6 min-23.4 min) for maximum production of those compounds. It was found that higher crude oil yield of 17.86 wt% was achieved under SWE (215°C, 15 min, 75 g/L) compared to conventional method (10.2 wt%). The similar pattern was also observed for carbohydrates and protein yields as shown by Fourier transform infrared spectroscopy (FT-IR) result. Overall, the findings of this study will benefit food and pharmaceutical industries as well as enhancing the usage of this abundant biomass for commercial purposes.

Keyword: Carbohydrates; Lipid; Microalgae; Soxhlet; Sub-critical water extraction